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door in the face of inductive science. It is time to be undeceived in this matter.

Wm. E. Ritter.

La Jolla, Calif.,
Sept. 20, 1909.

EXPERIMENTAL ZOOLOGY

Inheritance of Color in Pigeons.—The breeding experiments of pigeons, described by R. Staples-Brown in the *Proceedings of the Zoological Society of London* for 1908, pages 67–104, are of interest because he repeated certain experiments by which Darwin obtained a reversionary type resembling *Columba livia.* Darwin concluded that domesticated pigeons sprang therefore from the wild rock pigeon. The varieties of pigeons used by Staples-Brown were with one exception identical with those used by Darwin and the experiments were planned on similar lines. Darwin's experiment, it will be recalled, was as follows:[1] A black Barb was crossed with a white Fantail and a black Barb with a red Spot (white bird with tail and tail coverts red having a red spot on the forehead). Upon mating hybrids produced by these two crosses Darwin obtained a pigeon identical with *Columba livia,* excepting that "the head was tinted with a shade of red, evidently derived from the Spot, and was a paler blue than in the rock pigeon." Staples-Brown substituted a black and white Nun for Darwin's red Spot which was not readily obtainable.

A Nun is a white bird with certain well-defined markings of black, blue, red or yellow. The individuals used in Staples-Brown experiments were black and white, the black appearing on the chin and throat, part of the outer flight feathers, a few secondaries and tertiaries, the tail and upper and under tail coverts. The Barb pigeon is self-colored, black, red, yellow, dun or white, with a small beak and the skin around the eyes broad and carunculated. Black Barbs only were used in these experiments. The Fantails used were white. When the Barb × Fantail hybrids were bred to the Barb × Nun hybrids no reversionary types were produced. These experiments were discontinued owing to lack of space. However, when Barb × Fantail hybrids were mated together some of the offspring had blue feathers. The blue color was chiefly on the tail as described by

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[1] "Animals and Plants under Domestication," 2d edition, Vol. I, p. 209.

Darwin. A black tail bar was present and the wing coverts and back were of a smoky black color, obscuring the wing bars which are common to the rock pigeon. The reversionary type in some cases appeared in the F_1 generation. A similar result was obtained by Darwin in the F_1 generation from a Nun and a red Tumbler.

The author explains the fact of the reversionary blue not appearing until the F_2 generation in the Barb × Fantail cross, by assuming that the F_1 individuals contain some element which prevents the appearance of blue. This, he holds, is the factor for black self color, which is epistatic to blue. In the recombination of factors in F_2, those combinations containing blue without the black factor produce individuals with blue feathers, while those with the black factor exhibit black feathers but no blue ones.

Reference is made to other cases of reversion (sweet Peas and Stocks) in which its occurrence is due to the meeting of complimentary factors. He adds, ''In the case of the Barb × Fantail cross the evidence is not yet sufficient to show whether the factors needed to produce the atavistic condition are all present in the Barb and their effect merely hidden by the presence of the black factor, or whether a necessary factor is introduced by the fantail; but the fact that no blues came in the F_2 made from an F_1 (Barb × Fantail) × F_1 (Barb × Nun) distinctly suggests that some factor of the blue did come from the Fantail.''

The general result of the Barb × Fantail experiments shows a dominance of black and blue to white. This dominance, however, is imperfect, as the majority show some white feathers. In the F_2 generation from such crosses, the following types were obtained:

Black.
Black with some white feathers.
Blue.
Blue with some white feathers.
Red.
White with some colored feathers.
White.

The significance of the presence or absence of the white feathers is obscure. It was first thought that the white feathers indicated that the bird was producing white-bearing gametes. This is not true in all cases.

In matings of blues with white feathers, whites were produced, and a definite proportion of homozygous blues was to be expected. With one exception, however, all the blues produced from these matings showed some white feathers.

Some of these were probably homozygous, but it could not be tested without making use of a large number of such birds. The order of dominance was found to be black, blue, red and white. In minor characters, such as irides, color of beak and claws, the author obtained the following results; white irides dominate black, and there is some evidence of correlation between white iris and black plumage. There was also marked correlation observed between the pigment in the beak and to some extent in the claws, and the plumage. In general, white-plumage birds have white beaks and claws. In the case of eye-wattles, red is dominant over flesh color.

B. B. Horton.